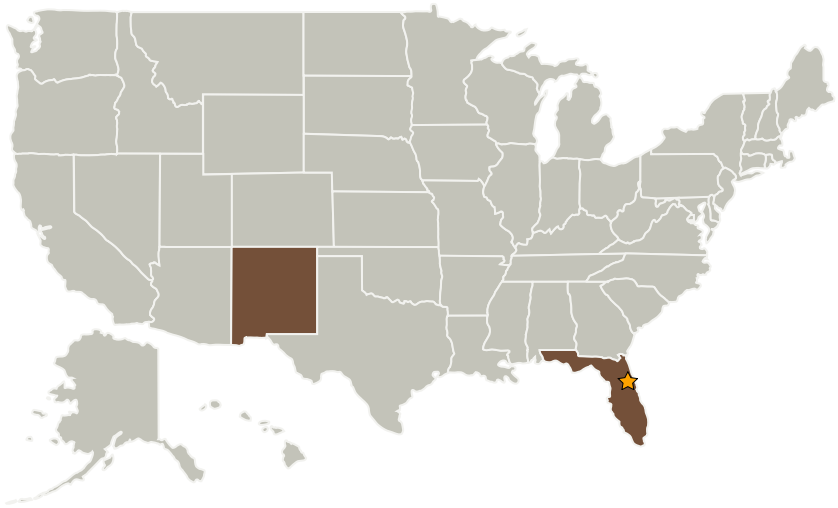
Lunar Regolith Stabilization for Excavation, Phase II

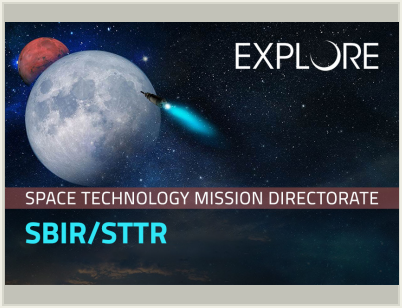
Completed Technology Project (2009 - 2011)

Project Introduction

During lunar exploration, regolith is both the major available resource and a substantial obstacle in establishing a long-term presence. The fine surface dust is highly abrasive and can both be a health hazard for the crew and the main contributor to equipment failure. Regolith is also the only material readily available to build protective shelters for the crew to prevent exposure to lethal doses of high-energy particles during solar eruption events. To achieve the needed cover, methods have to be developed to convert regolith into a stable building material with minimal need for terrestrial supplies. The technology should also be applicable to stabilize regolith in place, for example on excavated slopes or around air locks and landing fields where dust is disturbed by gas flows. In the Phase I program, Adherent Technologies, Inc. has developed the needed chemical formulations and application technologies to achieve both objectives. Regolith can be formed into solid building material using only 5% earth-supplied binder, and the same binder can be used to stabilize loose regolith in the vacuum of space. The proposed Phase II program will optimize the formulations and techniques developed previously and will design and build prototype applicators, both for spraying thin layers and for automated brick fabrication. Testing in a vacuum environment will demonstrate the capabilities and design concepts for deployable, weight optimized application systems will be included.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Adherent Technologies, Inc.	Supporting Organization	Industry	Albuquerque, New Mexico

Primary U.S. Work Locations	
Florida	New Mexico

Project Transitions

September 2009: Project Start

March 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation